

1993 SALMON FISHERIES MANAGEMENT PLAN
KOTZEBUE AREA

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Regional Informational Report ¹ No. 3A93-07

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Division of Commercial Fisheries, AYK Region
333 Raspberry Road
Anchorage, Alaska 99581

April 1993

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FISHERY BACKGROUND

The Kotzebue District includes all waters from Cape Prince of Wales to Point Hope. Chum salmon are the most abundant anadromous fish within this district. However, other salmon species (chinook, pink, coho, and sockeye) occur in lesser numbers as are char and sheefish.

Subsistence Fishery

Fishing has long been an important food gathering activity for people of Kotzebue area drainages. Remnants of fishing spears have been found within the area which date back as far as 1250 A.D. The subsistence fishery is still very important to the local people. A recent study of subsistence needs in Kotzebue found that the estimated 1986 chum salmon catch by Kotzebue residents was 35,000. The villages of Noatak, Noorvik and Shungnak harvested a combined average of 15,000 chum salmon annually over the past five years. Reported harvest figures are considered to be minimal since not all communities or fishermen were contacted. The villages of Kiana, Ambler and Kobuk have not been surveyed recently and are not included in harvest values. The estimated annual subsistence harvest of 50,000 chum salmon by Kotzebue area residents would seem a bare minimum.

Commercial Fishery

Commercial salmon fishing in the Kotzebue District dates back to 1914, when during a 4-year period, a canned and salt packed product was processed. The current chum salmon directed, commercial fishery was initiated in 1962 and occurs in ocean waters near Kotzebue (Figure 1). Commercial fishermen operate set gill nets primarily out of open skiffs powered by outboard motors. Buyers generally fly freshly caught, iced salmon out of the district in the round.

Commercial chum salmon harvests during the past 14 years (1979-1992) have ranged from 109,500 to 677,200 fish, the 14-year average being 306,504. Fishing effort during the same period has ranged from 143 to 199 fishermen, averaging 179 fishermen. During 1992, 289,184 chum and 204 chinook salmon were harvested by 149 fishermen. The total wholesale value of the harvest was \$533,731 and ranked as the fifth lowest value of the last 13 years. Chum Salmon brought roughly one-third the recent average price.

FISHERY OUTLOOK

Status of Stocks

Chum salmon abundance fluctuates greatly between years as noted by commercial harvests and escapements (Table 1). Although relative strength of parent-year escapements play an important role in the magnitude of chum salmon returns, other factors significantly affect the success of year classes. Such factors may

include fresh water mortality of salmon eggs and fry due to temperature and water level fluctuations, and harvest of Kotzebue origin salmon by foreign and domestic interception fisheries.

Enumeration surveys of the Noatak and Kobuk River systems have shown that of the two systems the Noatak system produces more salmon. Noatak River bound chum salmon pass through the commercial fishery primarily during August. Kobuk River bound chum salmon are of two components: (1) stocks bound for lower Kobuk River tributaries, which pass through the commercial fishery during July, and (2) stocks bound for the upper Kobuk River, which pass through the commercial fishery during August intermixed with Noatak bound fish.

Chum salmon returning to the Kotzebue area are primarily 3, 4, and 5 year old fish. The 13 year average brood year return for 1979-1992 is 5.9% 3-year-olds, 63.1% 4-year-olds, 29.2% 5-year-olds, and 1.8% 6-year-olds. The number of fish on lower Kobuk River tributary spawning grounds peak by about August 15 while those of upper Kobuk River and Noatak River spawning grounds peak by about September 1. Salmon deposit eggs in stream gravel where egg to salmon fry development occurs through the winter. If water levels during spawning are above normal, winter freezing of eggs and fry may occur in areas dewatered during reduced winter flows, greatly increasing freshwater mortality. High spawning ground mortality may partially explain poor runs which follow good parent year escapements. Fry emerge from stream gravel primarily during May and June and out migrate to marine waters.

1993 Wild Stock Return

The outlook for the 1993 season is based on the returning age classes of the 1992 season. During the 1993 season the four year old age component of the run is expected to be well below average, but the five year old component is expected to be near normal, as is the three year old component. The commercial harvest is expected to fall within the range from 150,000 to 250,000.

1993 Hatchery Stock Return

The Sikusuilaq hatchery brood stock is still building and is not expected to reach full production for several years. The 1993 hatchery contribution to the commercial catch is expected to be approximately 42,100 chum salmon and an additional 7,500 are expected to be utilized in the subsistence fishery. Another 7,500 chum will be required for 1993 brood stock, leaving a surplus of 7,000 salmon returning to the Noatak River in the vicinity of the hatchery. The hatchery stock is composed of the same age classes that compose the natural return but the size of each age class may vary depending on the level of hatchery production during a given parent year. Because of increasing production in recent years the younger age classes will be more significant than the older age class fish in their catch contribution to the hatchery return since the hatchery has been expanding gradually over the years.

The 1993 season is the second year that the hatchery production is not projected to be fully utilized by the harvest in the commercial fishery and brood stock needs at the hatchery.

MANAGEMENT OBJECTIVES AND STRATEGIES

Primary fishery management objectives are to provide adequate chum salmon escapement through the commercial fishery: (1) to ensure sustained runs by allowing adequate natural escapement, and (2) to meet subsistence harvest needs. Fishery management will be dependent on comparing period and cumulative season catch rates to prior years. Figure 2 compares the 1979-1992 average catch by period and CPUE by period. A comparison of catch rates over the history of the fishery has shown a close relationship to escapement. The comparative data base will be limited to the 1979-1992 year data to account partially for increased fleet efficiency and to encompass the range of years when similar fishing schedules were in effect, thus providing the best available comparative base.

Age composition of catches will be closely monitored to determine the strength of age classes in the return. Older salmon tend to migrate into freshwater first; a fact that affects catch rate as the season progresses and affects the fishery managers evaluation of the catch statistics. Weak 3 and 4 year old age classes will tend to depress mid-season catches.

Aerial surveys will be attempted beginning in mid-July on the Kobuk River tributaries. Aerial surveys are not a direct count or estimate of the salmon population but are used as an index for comparison with surveys both in season and in prior years. Surveys will be attempted until mid-September. Aerial surveys are usually made too late to effect present year fisheries decisions but do provide useful information in critiquing the years management decisions and help project future salmon returns.

The Noatak sonar project will continue this season, preliminary work began during August of 1988. Lower frequency transducers and radio link technology will be tested and installed during the 1993 season. The use of the sonar counts on the Noatak River as an escapement index will be further developed during the upcoming season, but it will have an increasingly important role this season. For the sonar to be successful it is critical to cover as much of a cross sectional area of the river as possible with the sonar beam. By 1994 the goal is to have the Noatak Sonar fully operational and no longer under development.

The test fishing project will be moved to the Kobuk River, in the vicinity of Kiana, to provide an inseason index of chum salmon passage there. It is hoped that within a few years this project will be considered a reliable escapement index.

The Kotzebue District fishery generally occurs on a twice weekly schedule. July fishing periods will be 24 hours in duration to protect the lower Kobuk River run from over harvest. The lower Kobuk run peaks in July and supports a major portion of the area's subsistence harvest. During August when the more abundant

Noatak River stock is dominant, fishing time is generally increased to two 36-hour periods per week or more if returns are large. Further adjustments in fishing time are based on trends in commercial catch rates over a series of periods. During seasons with poor returns, escapement needs will be protected by (1) reducing period length or (2) canceling some periods. The Kotzebue commercial fishing fleet appears to be very effective at capturing the majority of the fish in the district during any given period.

The first open commercial fishing period of the 1993 season will begin Thursday, July 8 to allow for normal period scheduling. Initial fishing periods will be from 6:00 p.m. Monday to 6:00 p.m. Tuesday and from 6:00 p.m. Thursday to 6:00 p.m. Friday. This fishing schedule will continue at least through July 17. Based on commercial catch rates, age composition, and catch per unit effort (CPUE), a decision will be made to adjust the length of periods for the next week. In order to maintain the catch rate index used to manage the fishery, the fishing periods will not be shortened by more than 12 hours. Until mid August management decisions will be based primarily on comparisons of 1993 commercial catch rates and the age class composition of the commercial catch to the 1979-1992 year averages. Beginning August 15 or period 12 management decisions will be made increasingly on the basis of the Noatak River sonar escapement index. The commercial fishery will be regulated a level of escapement needed to provide an adequate spawning population.

The Department plans to hold meetings with the Kotzebue Fishermen's Association as management concerns develop. Contact with the Kobuk River subsistence fishermen will also be maintained. However, the Kobuk Test Fishing Project will not be the primary index used in making management decisions.

ESCAPEMENT OBJECTIVES

Aerial survey enumerations of salmon within rivers are utilized: (1) to evaluate initial run strength while salmon are traveling to the spawning grounds, and (2) to document peak salmon abundance on the spawning grounds as an index to total escapement. These enumeration techniques are best initiated during times of low river water levels, high water clarity, and good sunlight penetration. Unfortunately, these conditions are not always available.

One of the primary fishery management strategies is to provide for minimum escapement levels within each river system. These minimum escapement levels are based on historic averages of peak spawning counts of specific index areas within major drainage. These escapement objectives are: (1) subject to continued review, (2) intended to evaluate escapement trends between years, and (3) are not a total count of the salmon escapement. Systems which are flown annually with associated chum salmon escapement goals are as follows: Noatak River (mouth to Kelly Bar-80,000 chum), Squirrel River (entire-11,500), Salmon River (entire-7,000), Tutuksuk River (entire-2,000), and upper Kobuk River (Kobuk Village to Beaver Creek-10,000). Other systems are flown as funding is available.

TABLE 1. KOTZEBUE DISTRICT CHUM FISHERY INFORMATION 1979-1992

COMMERCIAL CATCH	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Chum (in thousands)	141.6	367.3	677.2	417.8	175.8	320.2	521.4	261.4	109.5	352.9	254.6	163.3	239.9	289.2
Number of permits	181	176	187	199	189	181	189	187	160	193	165	153	143	149
Average chum per permit	782	2,087	3,622	2,099	930	1,769	2,759	1,398	684	1,829	1,543	1,067	1,678	1,941
Est. value (in thousands)	\$990	\$1,447	\$3,247	\$1,962	\$421	\$1,149	\$2,137	\$933	\$515	\$2,605	\$614	\$438	\$429	\$527
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ESCAPEMENT (in thousands)	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Noatak	19.7	164.5	116.4	20.7	78.9	67.8	44.0	37.2	9.3	45.9		20.0	80.8	34.3
Upper Kobuk	2.0	11.5	8.6	14.7	33.7	10.6	6.2	6.0	8.2	13.2		8.0	24.6	10.9
Squirrel	1.5	13.5	9.8	7.7	6.1	5.5	6.2	5.0	2.7	4.8		5.0	4.6	2.8
Salmon	0.7	8.5	4.7	5.4	1.7	1.5	2.0	2.0	3.3	6.2		6.1	5.8	1.3
Tutuksuk	0.4	1.2	1.1	1.3	2.6	1.1	5.1	4.3	0.2	3.1		3.0	0.7	1.2
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ESCAPEMENT GOALS														
Area	Goal													
Noatak River (mouth to Kelly Bar)	80,000													
Upper Kobuk (Kobuk Village to Beaver Creek)	10,000													
Squirrel (entire)	11,500													
Salmon (entire)	7,000													
Tutuksuk (entire)	2,000													

- a. Low escapement estimates due to poor survey conditions during peak spawning. Estimate achieved either under poor survey conditions (high turbid water) or before or after peak spawning.
- b. Foot surveys.
- c. Aerial surveys not feasible due to unfavorable weather and water conditions.

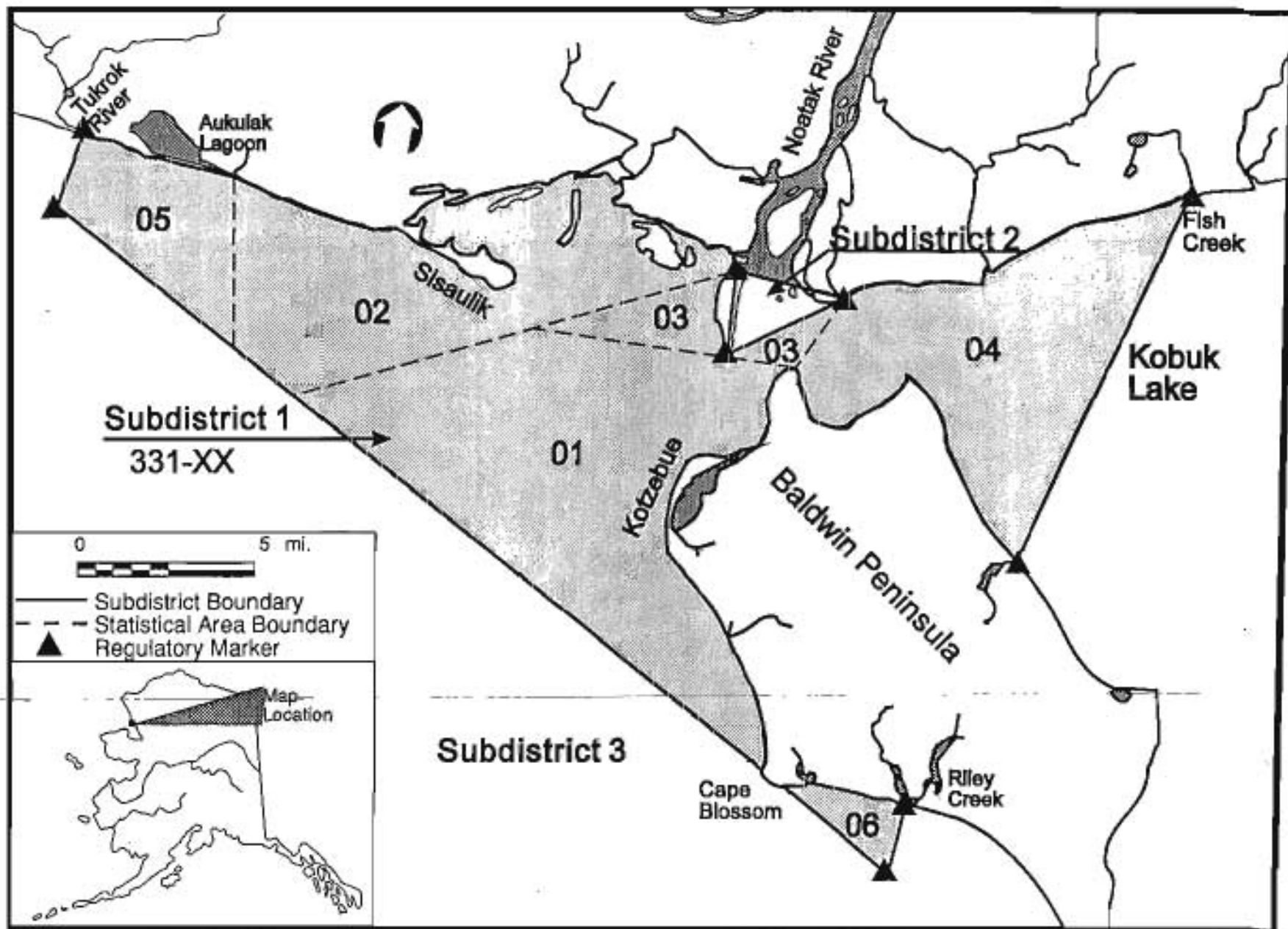
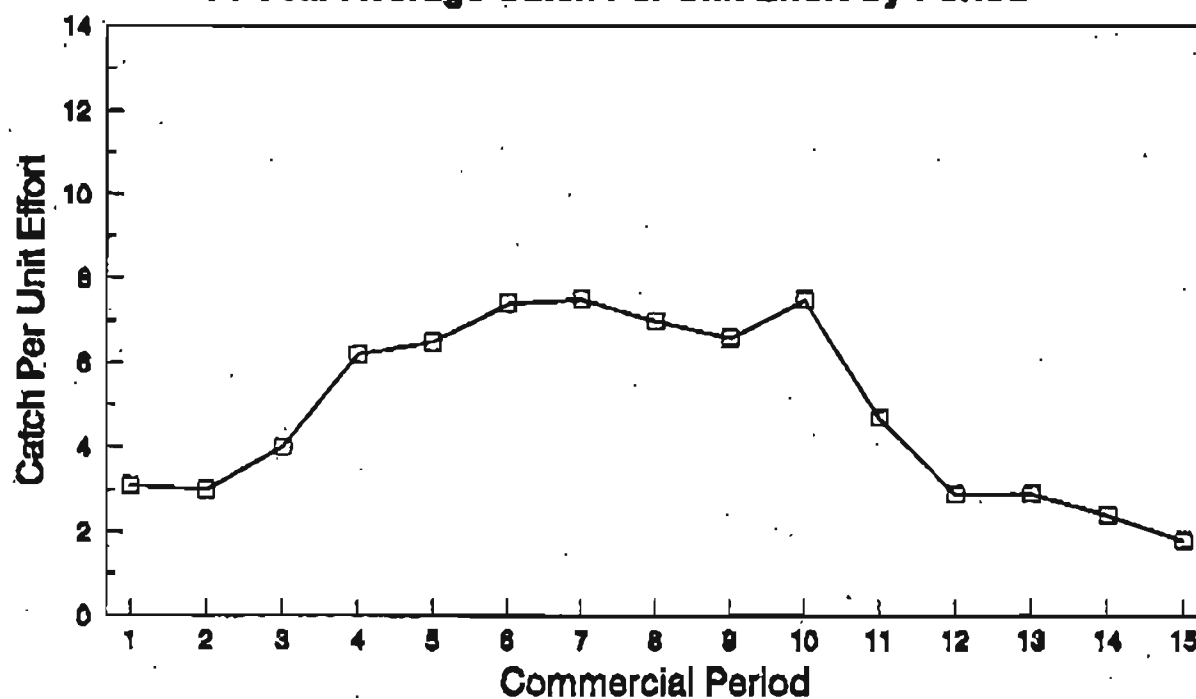


Figure 1. Kotzebue Commercial Fishing District.

Kotzebue Sound Chum Salmon

14 Year Average Catch Per Unit Effort by Period



14 Year Average Commercial Catch by Period

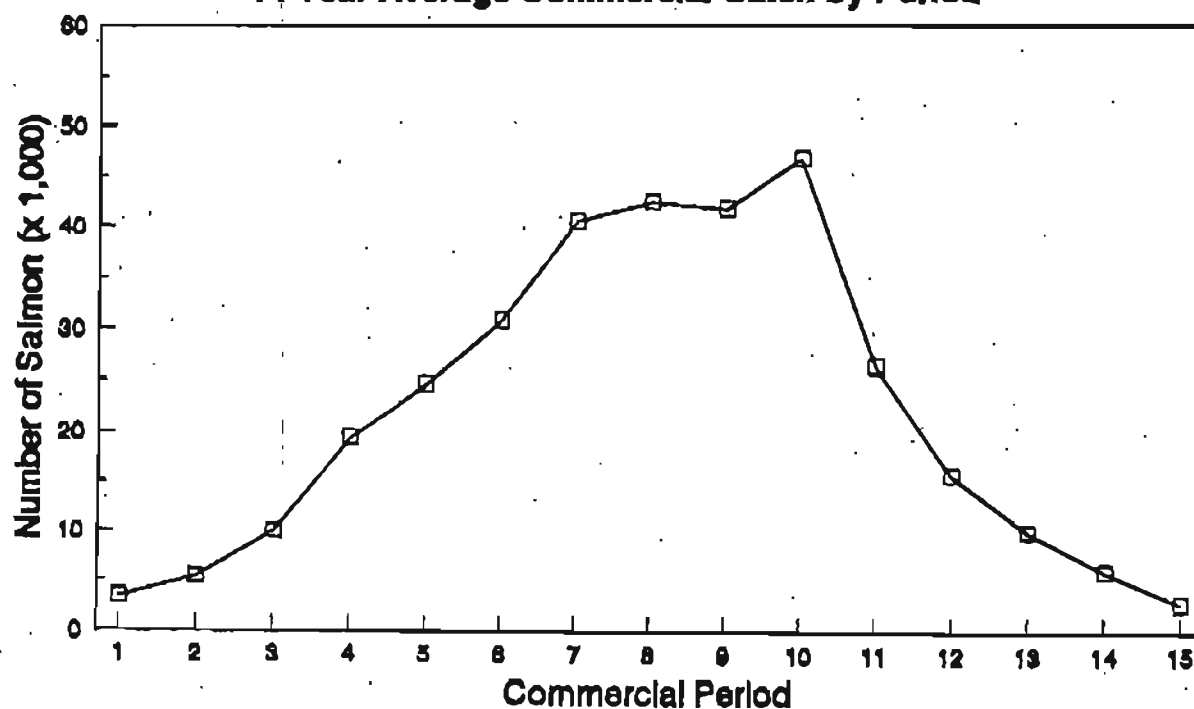


Figure 2. Kotzebue District 14 year average (1979-1992) catch per unit effort and commercial catch by period.

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